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ABSTRACT

The main purpose of this study is to reveal Turkish preservice science teachers' attitudes toward science and science teaching by using a Turkish translation of the last version of the Science Teaching Attitudes Scale (STAS-II) by Moore and Foy (1997). The sample size for the study was 612 freshman, sophomore, junior, and senior science education major students from 4 different teachers colleges located in different parts of Turkey. The reliability of the Turkish translation of STAS-II was found to be 0.80 with the test-retest method. There is a significant mean difference between class levels ($p=0.027$). Teachers colleges and student gender do not show significantly mean differences based on STAS-II scores. However, the uniqueness of the nationwide science curriculum and the unification of the education system may have importance in developing similar attitudes among Turkish students. (Author/YDS)

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A Study of Turkish Preservice Science Teachers´ Attitudes toward Science and Science Teaching

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Abstract

The main purpose of study was to reveal Turkish preservice science teachers´ attitudes toward science and science teaching by using a Turkish translation of the last version of Science Teaching Attitudes Scale (STAS-II) by Moore and Foy (1997). The sample size of study was 612 freshman, sophomore, junior and senior science education major students of four different teachers colleges located in different parts of Turkey. The reliability of the Turkish translation of STAS-II was found 0.80 with the test-retest method. There is a significant mean difference between class levels (p=0.027). Teachers colleges and gender of students do not show significantly mean differences based on STAS-II scores. However, the uniqueness of nationwide science curriculum and the unification of education system may have importance to develop similar attitudes among students in Turkey.

Introduction

Since this study is a cross-cultural study, it marks the first time a translated version of STAS-II was conducted on future science teachers of Turkey. Turkey, like other developing countries, pays great attention to education, and a majority of Turkish people believe that to reach the level of developed countries can only be accomplished through education, specially science education. In this sense, teacher education and preparation has a special meaning for Turkey. However, there is very little knowledge about science teachersí attitudes toward science and science teaching or how science teachers and teachers candidates perceive science and teaching science. This does not mean how much they know about science content. For this reason, the findings of the study will be useful for Turkish teacher preparation in general and science educators in particular.

According to Kobella (1988), the affective domain related to science education

is mainly concerned with attitudes related to science. Therefore, one of the main purposes of science education is to develop positive attitudes toward science and scientist. As a result, many teacher preparation programs emphasize changing of their pre-service science teachersí attitudes positively toward science and science teaching. In the past, science teaching in secondary schools was for the selected students who wanted to learn and make a career in a science area. However, in the USA National Science Education Standards (1996), one of the important aims of science education in the USA is to teach "science for every one and to create scientifically literate citizens", but escaping from science classes is still the norm world wide. For example, Baykul (1990) found that Turkish studentsí attitudes toward science and mathematics courses substantially decreased from Grade 5 through Grade 11. Students complained that the science courses were not useful, that the science and mathematics courses were extremely difficult, and that their math and science teachers had very negative attitudes.

Schwirian (1967) stated that attitude toward science is the basis of acceptance and support of science or the basis of rejection of science and scientific activities in a society. Therefore, the decline in attitude toward science may result in the decrease of scientific research support, for todayís students will be tomorrowís scientists and decision making persons in their society. In other words, students who have a positive attitude toward science are more likely promote science and scientific research in a country (Gieger, 1973). Consequently, countries like Turkey, need scientifically literate citizens. To achieve this goal we must examine the attitudes of our science teachers.

Methods and Procedures:

Instrument to be Used

The Science Teaching Attitude Scale II (STAS-II) was used in this research. STAS-II (Moore, 1997) was originally prepared by Moore in 1973 as STAS. It was an extension of Scientific Attitude Inventory (SAI) by the same author. Both attitudes tests were used in different schools and colleges in order to measure and assess students attitudes toward science. Later, under some critiques, these tests were revised and reduced the number of questions. The most important revised part of these tests was to put in a neutral option. The first versions of the tests did not have this option. Also, these tests were translated to Hebrew, Thai, and Spanish languages (Moore and Foy, 1997). It was necessary to translate STAS-II to Turkish in order to use for this research. For this purpose, the researcher whose native language is Turkish translated the

instrument to Turkish. It was checked by some researchers whose native languages are Turkish but are studying and teaching in the US universities and are at least at the graduate level in English language and science. The final Turkish translation and backtranslation of STAS-II were controlled by the same researchers. Consequently, both sides agreed with the final translation of STAS-II, the test was ready to be used in science education departments of Turkish Teachers Colleges.

STAS-II has 60 statements related to science and science teaching. This likert-type scale test consists of 30 positive and 30 negative statements toward science and science teaching. They are classified under eight main sub-scales and each sub-scale has two part sub-scales as positive (A) and negative (B) parts, additionally, so that the total number of sub-scales is 16. All statements are assigned to 16 sub-scales.

Due to the difficulties of assessing an attitude toward a subject, the author of STAS-II prepared more than one statement for each sub-scale to understand a personsí attitude.

In addition to STAS-II, some demographic questions, for instance, age, family income, gender, etc., were added to the test in order to examine how variables effect attitudes toward science and science teaching and the relationships of variables.

Data Gathering and Time Frame

To collect data for this research, students were asked to fill out the questionnaire during class sessions with permission of the course instructor and department head or college dean. Before conducting the research, a letter was sent to all four teachersí college deans for their permission and to explain the purpose and importance of this research. Following such permission, the researcher traveled to Turkey and visited the four teachers colleges. Generally, the time period for each institution was approximately one week so that the total time for the research was one month. During the class period, the written questionnaires were distributed to each respondent who had 60 minutes to answer the questionnaire.

Statistical Procedure

The study was analyzed under cross-section or between subjects of three factors (gender, years, and teachers colleges) ANOVA and " level 0.05. When statistically significant factors or interactions were found, post-hoc test by using Tukey test and simple main effect test followed.

Participants

Information was provided by Turkish teachers college students whose majors were science education. Currently, in Turkey there are 70 universities both public and private. Forty of these universities have teachers college or education colleges. Some of these universities have different teachers colleges, such as vocational teachers colleges, and technical teachers colleges. For example, Gazi University located in Ankara-Turkey has five different teachers colleges whose graduates can become high school and primary school teachers, and vocational and technical high school subject teachers. In addition to these teachers colleges in Turkey, science and art, engineering, and theology colleges graduates are able to become teachers in elementary and secondary schools by taking additional education courses (educational psychology, sociology, etc.). As can be seen, different colleges provide teachers to schools in Turkey. However, for the first time, in 1993 in addition to biology, physics, chemistry, and mathematics education departments, some teachers colleges established science education departments in order to fill the shortage of science teachers especially in primary schools. In these schools, science is taught as a single course covering biology, physics, earth science, and chemistry contents. In August, 1997, compulsory education was increased from five years to eight years. For this reason, remaining teachers colleges began to open science education departments or merging biology, chemistry, and physics education departments under a single science education department. Currently, seven public universities have science education departments under teachers or education colleges. Although seven universities have such a department, only four of them had senior level students in science education departments in 1998. The remaining Selcuk, Inounu, Balikesir universities have newly established science education departments. Therefore, they were eliminated from the study, only the remaining Gazi, Dokuz Eylul, Karadeniz Technical and Ataturk Universitiesí education colleges were chosen for this study. Six-hundred and twelve students who ranged from freshman to senior were selected from the four teachers colleges.

Summary of Some of the Preliminary Findings and Discussion

STAS-II was evaluated its reliability and validity tests by Moore and Foy

(1997). However, the Turkish translation of STAS-II had to be tested for its reliability. By using test-retest method, the reliability of the Turkish version of STAS-II was found 0.80. The validation of the Turkish STAS-II was checked by a group of panel judges before using the test. Overall scores indicate that pre-service Turkish science teachers have positive attitudes toward science and science teaching. Tables 1 and 2 show the means and three-way ANOVA results of Turkish pre-service science teachersí attitudes toward science and science teaching.

Table 1

Means and Standard Deviations of Attitudes Toward Science and Science Teaching

University		Mean	SD	N
	Ataturk	201.5	10.8	160
	Dokuz Eylul	201.1	9.1	138
	Gazi	200.6	8.8	154
	Karadeniz T.	200.6	9.1	160
Class Level				
	Freshman	199.3	10.0	187
	Sophomore	201.3	9.2	120
	Junior	202.5	9.2	132
	Senior	201.1	8.4	173
Gender				
	Female	200.7	9.2	309

	Male	201.2	9.5	303
Total		200.9	8.8	612

Table 2

Three-way Analysis of Variance by University, Gender, and Class Level on Attitude toward Science and Science Teaching

Source	SS	df	MS	F	Sig.
UNIVERSITY (A)	215.25	3	71.75	.826	.480
GENDER (B)	2.21	1	2.21	.025	.873
CLASS (C)	813.23	3	271.08	3.121	.026*
AxB	642.54	3	214.18	2.466	.061
AxC	816.6	9	90.73	1.045	.403
BxC	72.14	3	24.05	.277	.842
AxBxC	643.4	9	71.49	.823	.595
Error	50371.14	580	86.85		
Total	24760797.87	612			

*P<0.05

After getting the results of the test, between class levels (freshman, sophomore, junior and senior), there was a significant difference (p=0.026). The following post-hoc test showed that mean differences of upper class levels were significantly different from those of low class levels. One of the reasons may be the number of science courses increasing from freshman to senior and another reason could be science teaching method courses taught in upper class levels. These results may indicate another validity of the Turkish version of STAS-II. With this result, the fist null hypothesis was rejected and the answer of the first research question is that there is a significant mean difference between class levels based on overall STAS-II scores of Turkish preservice science teachersí attitudes toward science and science teaching. Also, the same null hypothesis will be tested other sub-scores of STAS-II for Turkish students in the future.

such as overall positive and negative scores of STAS-II and other sub-scalesí scores of STAS-II. The remaining two null hypotheses were not rejected that differences between universities and gender are not significant. The students who study in different universities as science education majors do not have significant mean differences, although the chosen universities for this research are located in the different parts of Turkey. This could be one of the outcomes of unique curriculum in nationwide and the unification of education system in Turkey.

References

Baykul, Y. (1990). Ilkokul Besinci Siniftan Lise ve Dengi Okullarin Son Siniflarina Kadar Matematik ve Fen Derslerine Karsi Tutumda Gorulen Degismeler ve Ogrencilerin Secme Sinavindaki Basari ile Iliskili Oldugu Dusunulen Bazi Faktorler [To What Extent the Studentsí Attitudes Towards Mathematics and Science Subjects Were Changed in the Turkish Schools in Grades Five through Eleven, the Factors Which Might Have Some Significant Relation with the Student Performance in Student Selection Exam]. Ankara,Turkey: OSYM Yayinlari.

Gieger, M. M. (1973). A study of scientific attitudes among junior college students in Mississippi. Unpublished Doctoral Dissertation, The University of Southern Mississippi, Mississippi.

Koballa, T. R. (1988). Attitude and related concepts in science education. Science Education, 72, 115-126.

Moore, R. W. (1973). The development, field test, and validation of scales to assess teachersí attitudes toward teaching elementary school science. Science Education, v:57, 271-278.

Moore, R. W., & Foy, H. L. R. (1997). The scientific attitude inventory: A revision (SAI-II). Journal of Research in Science Teaching, 34, 327-336.

Schwirian, P. N. (1968). On measuring attitudes toward science. Science Education, 52, 172-179.